

GAO

Report to the Chairman, Subcommittee
on National Security, Veterans Affairs,
and International Relations, Committee
on Government Reform, House of
Representatives

July 2001

TACTICAL AIRCRAFT

Continuing Difficulty Keeping F-22 Production Costs Within the Congressional Limitation



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United States General Accounting Office
Washington, DC 20548

July 16, 2001

The Honorable Christopher Shays
Chairman, Subcommittee on National Security,
Veterans Affairs, and International Relations
Committee on Government Reform
House of Representatives

Dear Mr. Chairman:

The Air Force F-22 Raptor is designed to be an air superiority aircraft with an air-to-ground attack capability and is to replace F-15 fighter aircraft. Lockheed Martin Corporation and Pratt & Whitney Corporation are the contractors for the airframe and engine, respectively. Development of the aircraft, which started in 1991, is currently scheduled to be completed in September 2003, according to the Air Force. The Air Force had planned to award contracts to begin low-rate initial production in December 2000. However, award of a fully-funded contract for 10 low-rate initial production aircraft approved for fiscal year 2001 has been delayed at least until after completion of the President's review of Department of Defense (DOD) programs. The Air Force currently plans to procure 333 production aircraft through 2013. The cost of F-22 production is limited¹ to \$37.6 billion by the National Defense Authorization Act for Fiscal Year 1998², but the act does not specify the total number of aircraft to be procured.

As requested, we updated information we provided to the Subcommittee in August 2000³ on the Air Force's F-22 production program and the service's efforts to offset production cost increases through activities known as production cost reduction plans. Specifically, this report (1) identifies the amount of potential offsets attributable to production cost reduction plans by F-22 contractors, (2) compares the latest F-22

¹ The cost limitation, as adjusted, is currently \$37.6 billion for 333 aircraft and does not include \$1.575 billion associated with six aircraft labeled Production Representative Test Vehicles that are excluded from the production cost limitation. Those aircraft are funded mostly with appropriations for Research, Development, Test and Evaluation as approved by the Congress. The production cost limitation does however, include about \$200 million of costs related to those six aircraft.

² P.L. 105-85, Nov. 18, 1997.

³ *Defense Acquisitions: Recent F-22 Production Cost Estimates Exceeded Congressional Limitation* (GAO/NSIAD-00-178, Aug. 15, 2000).

production cost estimates completed by the Air Force and the Office of the Secretary of Defense with the congressional cost limitation and determines the extent to which cost reduction plans were considered in establishing these estimates, and (3) provides the status of DOD's actions to implement recommendations included in our August 2000 report concerning production cost estimates and cost reduction plans for the F-22 program.

Results In Brief

F-22 contractors and the Air Force have been developing cost reduction plans that are created to reduce costs by enhancing production technology, improving manufacturing techniques, and improving acquisition practices. The amount of cost reductions the contractors estimated to be achievable through production cost reduction plans has increased substantially since 1997. The contractors' estimated reductions in costs associated with these plans increased from \$13.1 billion in January 1997, to \$21 billion in mid-2000, to \$26.5 billion in January 2001.

In late 2000, both Air Force and the Office of the Secretary cost estimators projected that F-22 production costs would exceed the \$37.6 billion congressional cost limitation if the Air Force were to procure 333 F-22s. Air Force cost estimators projected the likely cost at \$39.6 billion⁴; the Office of the Secretary estimated the likely cost at \$46.6 billion.⁵ Air Force and Office of the Secretary estimates differ mainly because their respective cost estimators made differing judgements about labor efficiency, engine costs, and the potential impacts of production cost reduction plans designed by F-22 contractors to reduce the production costs of F-22s. Cost estimators from the Air Force and Office of the Secretary both agree that many of the cost reduction plans will result in cost reductions. However, they do not agree on which of the plans are fully viable, or the amounts of cost reductions that will be generated. For example, the Office of the Secretary estimated that \$1 billion less would be

⁴ Air Force cost estimators projected the costs for 331 aircraft at \$38.5 billion. To arrive at the cost for 333 aircraft that are planned, \$1.1 billion must be added for 2 production representative test aircraft and advance procurement for 6 production representative test aircraft approved for fiscal year 1999, making the projected cost \$39.6 billion for 333 aircraft.

⁵ Briefing documents indicate that Office of the Secretary estimators projected the costs for 331 aircraft at \$45.5 billion. To arrive at the projected cost for 333 aircraft that are planned, \$1.1 billion must be added for 2 production representative test aircraft and advance procurement for 6 production representative test aircraft approved for fiscal year 1999, making the projected cost \$46.6 billion for 333 aircraft.

saved by the planned manufacturing cost reductions as compared with the Air Force's estimated cost reductions. Because F-22 production is in its early stages (a fully funded contract for production has not yet been awarded), most of the cost reductions associated with the plans have not yet been achieved. However, the Air Force asked the Defense Contract Audit Agency (DCAA), an agency responsible for contract audits at DOD, to conduct a limited, independent review of the validity of some plans that accounted for about 2 percent of the estimated cost reductions. DCAA did not generally take exception to the potential cost reductions associated with these plans.

DOD and the Air Force have been partially responsive to the recommendations included in our August 2000 report on F-22 production cost estimates.⁶ We recommended that the Air Force improve the regularity and scope of its reporting to the Under Secretary of Defense for Acquisition, Technology, and Logistics on the status of the cost reduction plans. We recommended the reports include summary information such as the total number of cost reduction plans identified and implemented, the total estimated cost reductions, and cost reductions realized to date. However, the Air Force has not regularly reported that information in the manner we recommended. For example, the information reported did not include estimated cost reductions realized. We also recommended that DOD reconcile the number of F-22s needed with the amount of the congressional cost limitation on F-22 production. DOD partially concurred with that recommendation and advised us they would make the judgements as part of the next Quadrennial Defense Review. Since DOD made that response, the President has directed that the Secretary of Defense review defense programs.

This report contains no new recommendations as DOD efforts to implement our prior F-22-related recommendations are still in progress.

Background

Because of potential cost increases, the Air Force established a team—the Joint Estimating Team—to review the total estimated cost of the F-22 program. This team reported in 1997 that the cost of the F-22 production program could grow substantially from the amount planned, but that the contractors should design cost reduction plans to fully offset that cost

⁶ *Defense Acquisitions: Recent F-22 Production Cost Estimates Exceeded Congressional Limitation* (GAO/NSIAD-00-178, Aug. 15, 2000).

growth. The Office of the Under Secretary of Defense for Acquisition, Technology and Logistics generally adopted the team's recommendations to change certain aspects of the program as well as a plan to define and implement cost reduction plans. The contractors have continued since 1997 to refine and increase the number and dollar amounts associated with the plans to reduce F-22 production costs.

Ultimately, the savings to be achieved by production cost reduction plans must be reflected in lower production contract prices, and lower expenditures by the Air Force than would have been the case if the plans had not been implemented. The Air Force and contractors have entered into memoranda of understanding that relate the affordability of F-22 production to contract prices that will be negotiated for low-rate initial production. The memoranda established target price objectives against which the negotiated prices will be evaluated and financial incentives to achieve the target price objectives for the applicable production lots. To encourage a reduction in production costs, the Air Force and contractors agreed that production cost reduction plans would be proposed, approved and implemented as appropriate. The Air Force agreed to reimburse certain investment costs and to pay award fees to the contractors based on negotiating contracts for certain prices. Until contract prices are negotiated, cost estimates will continue to reflect judgements of estimators about the potential impact of cost reduction plans when implemented.

Potential Cost Reductions Identified by Contractors Have Increased

In an effort to offset production cost increases, F-22 contractors have been developing production cost reduction plans to enhance production technology, improve manufacturing techniques, and improve acquisition strategies and subcontract agreements for buying materials. These cost reduction plans are categorized as: implemented, not yet implemented, or "challenge". The Air Force and contractors' criteria for determining if a cost reduction plan is implemented include whether

- the contractor has submitted a firm-fixed price proposal that recognizes the impact of the cost reduction,
- the impact of the reduction has been reflected in a current contract price—either with the prime contractor or a supplier to the prime contractor,
- the contractor has reduced the standard number of hours allocated to a specific task,
- the reduction has been negotiated in a forward pricing rate agreement, or the reduction has been negotiated with a subcontractor or vendor.

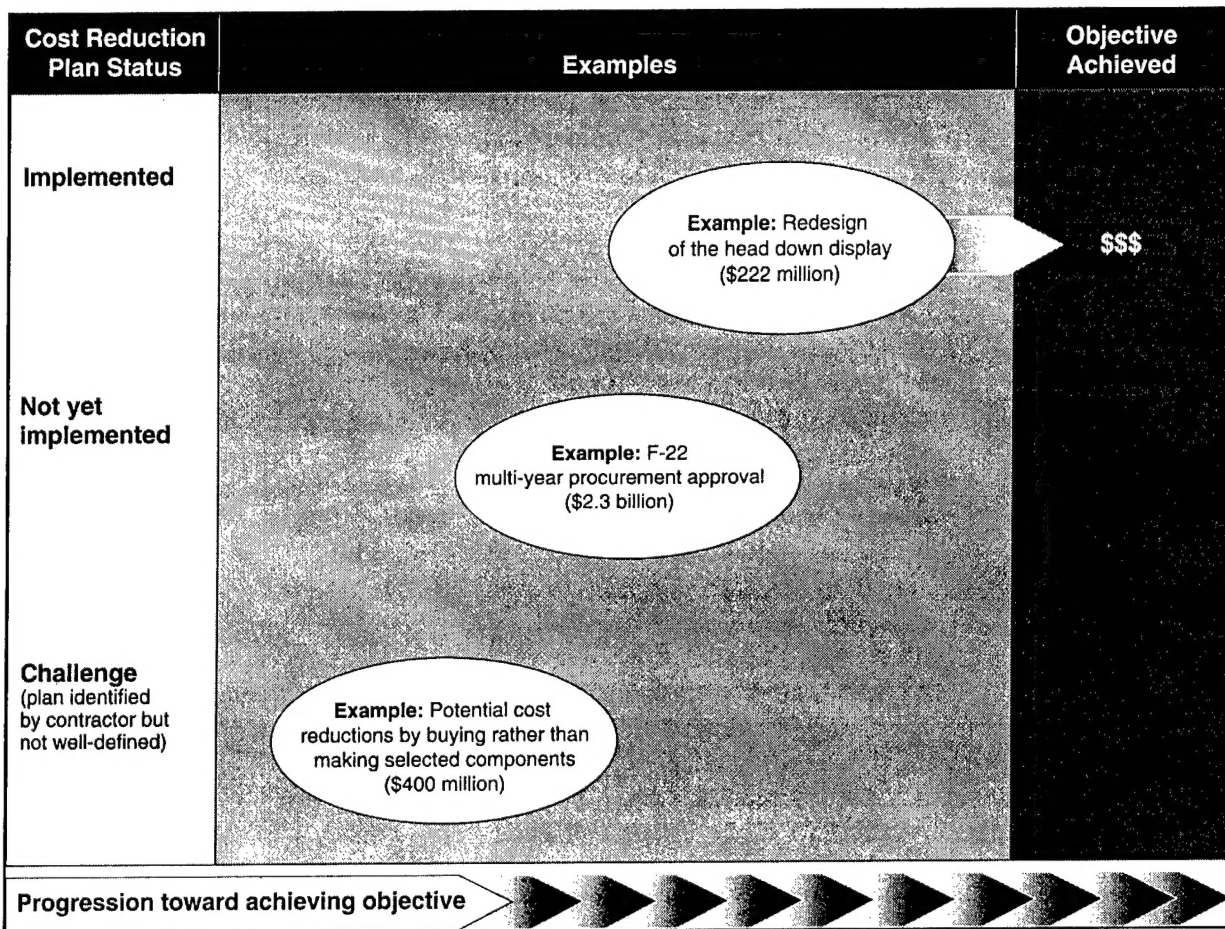
Plans are categorized as not yet implemented if none of the criteria are met. Challenge plans represent additional potential savings in areas that have been identified, but that are not yet well defined.

The contractors' estimated reductions in costs that are associated with F-22 cost reduction plans increased from \$13.1 billion in January 1997, to \$21 billion in mid-2000, to \$26.5 billion in January 2001. According to the contractors, the \$26.5 billion is distributed as follows by category:

- About \$13.7 billion (52 percent) in cost reductions that have been implemented;
- About \$8.5 billion (32 percent) in cost reductions not yet implemented; and
- About \$4.2 billion (16 percent) labeled as a challenge amount.

Figure 1 shows examples of implemented, not yet implemented, and challenge cost reduction plans and the relative progression of these plans toward potentially achieving some cost reductions in the future.

Figure 1: Examples of Progression of Production Cost Reduction Plans



Latest F-22 Production Cost Estimates Exceed Cost Limitation by a Greater Margin

In late 2000, the Air Force cost estimators projected, in an estimate supporting the fiscal year 2002 budget request, that production costs of 333 F-22s were likely to exceed the \$37.6 billion congressional cost limitation by \$2 billion. The cost estimate produced by the Office of the Secretary indicates that costs will likely exceed the congressional cost limitation by \$9 billion. Important reasons for the differences between Air Force and Office of the Secretary estimators are differing judgements about labor efficiencies, engine costs, and the viability of cost reduction plans and their potential impact on the cost of F-22 production.

Production Cost Estimates Have Increased

In late 1999, both the Air Force and Office of the Secretary cost estimators projected that production costs for 339 aircraft would exceed the congressional cost limitation of \$39.8 billion in effect at that time. The Air Force cost estimators projected production costs at \$40.8 billion, and the Office of the Secretary estimated \$48.6 billion for the 339 production aircraft. Even though the cost estimates exceeded the \$39.8 billion cost limitation in effect at that time, the Secretary of the Air Force maintained that the cost would not exceed the limitation, and established the Air Force's position on F-22 production cost at \$39.8 billion.

In estimates made in December 2000 to support the fiscal year 2002 budget request, both Air Force and Office of the Secretary cost estimators continue to project that F-22 production costs will exceed the congressional cost limitation. Table 1 shows the details of these estimates and the amounts by which the estimates exceed the congressional cost limitation.

Table 1: Comparison of Latest Air Force and Office of the Secretary F-22 Production Cost Estimates With the Congressional Cost Limitation

Then-year dollars in billions		
Estimates	Air Force	Office of the Secretary
Estimate (333 production aircraft)	\$39.6	\$46.6
Cost limitation (333 production aircraft)	\$37.6	\$37.6
Amount over the cost limitation	\$2.0	\$9.0

Source: GAO analysis of Air Force and Office of the Secretary data

The current cost limitation of \$37.6 billion has been adjusted to reflect planned acquisition of 333 production aircraft, 6 fewer than included in the cost limitation in effect in 1999. This change reflects congressional action on the fiscal year 2000 Air Force budget, in which the Congress approved funding for 6 aircraft using appropriations for Research, Development, Test and Evaluation. Accordingly, the 6 aircraft and associated costs of \$1.575 billion (excluding about \$200 million that had been appropriated in fiscal year 1999 for advanced procurement for those aircraft) were eliminated from the production cost limitation and added to the development cost limitation.

If the Office of the Secretary's higher estimate is correct and additional cost reduction plans are not developed and implemented, we project that the Air Force would have to buy about 85 fewer F-22s (or about 25 percent) than the 333 aircraft now planned to stay within the cost

limitation. In our August 2000 report, we had also calculated that the Air Force would not be able to procure about 85 F-22s if the Office of the Secretary's 1999 estimate was correct.

Differing Judgements About Viability of Cost Reduction Plans in Developing Cost Estimates

The Air Force and the Office of the Secretary cost estimators included in their projections the effect of cost reduction plans that have been categorized as implemented. They also estimated the expected future impact of cost reduction plans that have not yet been implemented. Neither included challenge plans.. Air Force officials advised us that their cost estimates consider the same cost reduction plans as the Office of the Secretary estimators, but that differing judgements regarding the viability of the plans and potential amounts of cost reductions are applied. Table 2 compares the two cost estimates.

Table 2: Comparison of Production Cost Estimates by the Air Force and the Office of the Secretary and the Impact of Cost Reduction Plans on These Estimates

Then year dollars in billions		
Estimate	Air Force	Office of the Secretary
Production cost estimate including implemented cost reduction plans	\$47.2	\$51.9
Impact of not yet implemented cost reduction plans	(\$7.6)	(\$5.3)
Total	\$39.6	\$46.6

Source: GAO analysis of Air Force and Office of the Secretary data

Air Force and Office of the Secretary officials attributed the majority of the differences in the estimates to the Office of the Secretary having—

- Estimated higher labor costs than the Air Force relating to subcontractor efforts,
- Estimated higher costs for the F-22 engines,
- Excluded some cost reduction plans because of the limited viability, and
- Estimated more conservative savings from some cost reduction plans.

Labor costs for subcontractors projected by estimators from the Office of the Secretary were \$3.0 billion more than those projected by Air Force cost estimators. Projections of engine costs by the Office of the Secretary estimators were \$1.2 billion higher. The Office of the Secretary also excluded some planned manufacturing cost reduction plans because they were not adequately detailed, and estimated \$1 billion less would be saved by the planned manufacturing cost reductions than did the Air Force.

Further, the Office of the Secretary estimated \$800 million less in cost reductions than the Air Force for plans relating to productivity investments.

Limited Validation of Eleven Cost Reduction Plans at Three Contractor Locations

Because F-22 production is in its early stages, few plans have resulted in actual cost reductions. However, analysis of plans categorized as implemented do show indications that lower costs can be achieved. The Air Force in mid-2000 asked DCAA⁷ to conduct a limited, independent review of some of these plans. In late 2000, the DCAA examined eleven cost reduction plans totaling \$425 million of total estimated savings of \$26.5 billion. These eleven plans were chosen so DCAA could examine cost reduction plans at different stages of development and at different locations including Lockheed Martin Aeronautical Systems, Marietta, Georgia; Lockheed Martin Tactical Aircraft Systems, Fort Worth, Texas; and Boeing Military Aircraft, Seattle, Washington. DCAA did not conduct detailed audits of these cost reduction plans. Their reviews focused primarily on methodologies used to calculate the reported savings or the verification of rates or material cost used in the calculations of contractor reported savings.

DCAA did not take exception to the potential cost reductions for 8 of the 11 plans reviewed; found potential cost reductions on two others to be based on judgement, not discrete, measurable events; and found documentation on one to be lacking. Regarding the one plan where documentation was lacking, DCAA auditors were unable to validate contractor estimates totaling around \$2 million that involved a new process developed to only require one step to drill a hole in the airframe, rather than two steps.

Actions to Implement Prior GAO Recommendations

Our August 2000 report recommended that the Secretary of Defense reconcile the number of F-22s that need to be procured with the cost limitation and report to the Congress on the implications of procuring fewer F-22s because of potentially higher costs. DOD partially agreed, stating that the affordability of the F-22 will be evaluated during an upcoming Quadrennial Defense Review.

⁷ DCAA is responsible for contract audits at DOD.

We also found that Air Force quarterly reports provided to the Under Secretary of Defense for Acquisition, Technology, and Logistics did not regularly highlight major changes associated with cost reduction plans. While the status of individual cost reduction plans are tracked by contractors and the F-22 Program Office, we believe regular reporting by the Air Force to the Under Secretary of Defense on the status of these plans is necessary to continuously assess their impact on the estimated cost of F-22 production. Achievement of the estimated cost reductions embodied in the plans is critical to completing F-22 production within the congressional cost limitation. Quarterly reporting of cost reduction plan information enhances its visibility. As a result, we recommended the Air Force report to the Under Secretary of Defense on the status of the cost reduction plans each quarter and that quarterly reports include summary information such as the total number of cost reduction plans identified, the number implemented, the total estimated cost reductions, cost reductions realized to date, and additions or deletions from the plans included in the prior report.

DOD concurred with our recommendation in October 2000 and agreed to report cost reduction plan information in subsequent quarterly reviews to the Under Secretary of Defense for Acquisition, Technology and Logistics. DOD agreed that the achievement of cost reduction plans is essential to the execution of the F-22 program within the congressional cost limit. However, our recommendation has not been implemented. In the Air Force's March 2001 quarterly review to the Under Secretary, the information reported included only summary information on the total estimated cost reductions.

Agency Comments and Our Evaluation

In commenting on a draft of this report, DOD agreed there continues to be a notable difference between the Air Force and Office of the Secretary F-22 production cost estimates. They indicated that data would emerge toward verification of these estimates as the program begins to accumulate production cost data.

DOD also agreed that the dollar amounts associated with the cost reduction plans have continued to increase since 1997. They indicated that as F-22 cost pressures have increased, so have the number of cost reduction plans and the cost reductions attributed to them.

In commenting on the progress the Air Force has made toward complying with our recommendation from August 2000 for specific cost reduction plan information to be reported in quarterly reviews, DOD indicated the

information reported in the last quarterly review (June 2001) contained more detailed information. We have examined the June 2001 quarterly review and agree it contains more information on cost reduction plans than previous quarterly reviews. Information on the total estimated cost reductions was reported. However, the information reported is still not consistent with what we recommended be reported in August 2000. Information was not reported as we recommended regarding the total number of cost reduction plans identified, the number implemented, the cost reductions realized to date, and any additions or deletions from the plans included in the prior report.

Scope and Methodology

To identify the amount of potential offsets attributable to production cost reduction plans by F-22 contractors we reviewed contractor cost reduction plans to determine the basis for the reductions expected to be achieved and whether the reduction was implemented or not yet implemented. We reviewed the documentation from the contractors and discussed the plans and the Air Force procedures for reporting on such plans with contractor and Air Force officials.

To compare the latest F-22 production cost estimates of the Air Force and the Office of the Secretary with the congressional production cost limitation and to determine the extent to which cost reductions plans were considered in establishing these estimates, we reviewed the Joint Estimating Team's report and various Air Force briefings. We discussed the estimates with officials in the Office of the Secretary and the Air Force's F-22 Program Office to determine why they differed. We compared the two estimates, including the baseline estimate, the estimated reductions from cost reduction plans, and the net estimates. We obtained a description of the reasons for the variances between the two estimates. We also discussed the estimates and production cost limitation with Air Force and Office of the Secretary officials. The Office of the Secretary cost estimate shown in this report is recorded in briefing documents we obtained during the course of our review. The Office of the Secretary provided us neither its cost estimate nor documentation related to its cost estimate. Officials from the Office of the Secretary cited their policy of not allowing access to that information because they considered it predecisional. However, we corroborated the information contained in the briefing documents we analyzed. An Office of the Secretary official reviewed and agreed with the estimated and projected costs included in this report that are attributed to the Office of the Secretary. To calculate the number of F-22s that could not be procured within the cost limitation we allocated the dollars in the Office of the Secretary estimate to

production lots 1 through 11 in the previous Air Force estimate. Starting with the adjusted costs for production lot 1, we determined how many aircraft could be purchased without exceeding the applicable cost limitation

To evaluate whether the Office of the Secretary and the Air Force were complying with our prior recommendations, we determined whether a defense review, that potentially could reconcile the number of F-22s needed with the cost limitation, had been completed. We also reviewed recent quarterly briefings from the Air Force to the Under Secretary of Defense for Acquisition, Technology and Logistics to determine how the information included on production cost reduction plans compared to the information we recommended be included in the briefings.

In performing our work, we obtained information or interviewed officials from the Office of the Secretary of Defense, Washington D.C.; the F-22 Program Office, Wright-Patterson Air Force Base, Ohio; the Defense Contract Management Agency, Marietta, Georgia; Lockheed Martin Aeronautical Systems, Marietta, Georgia; Lockheed Martin Tactical Aircraft Systems, Fort Worth, Texas; and Boeing Military Aircraft, Seattle, Washington. We performed our work from December 2000 through May 2001 in accordance with generally accepted government auditing standards.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies to appropriate congressional committees; the Secretary of Defense; the Acting Secretary of the Air Force; and the Director, Office of Management and Budget. Copies will also be made available to others on request.

Please contact me at (202) 512-4841 or Robert D. Murphy at (937) 258-7904 if you or your staff have any questions concerning this report. GAO staff acknowledgments to this report are listed in appendix II.



Allen Li
Director, Acquisition and Sourcing Management

Appendix I: Comments From the Department of Defense



ACQUISITION,
TECHNOLOGY
AND LOGISTICS

OFFICE OF THE UNDER SECRETARY OF DEFENSE

3000 DEFENSE PENTAGON
WASHINGTON, DC 20301-3000

29 JUN 2001

Mr. Allen Li
Director, Acquisition and Sourcing Management
U.S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Li:

This is the Department of Defense (DoD) response to the General Accounting Office (GAO) draft report, "TACTICAL AIRCRAFT: Continuing Difficulty Keeping F-22 Production Costs Within the Congressional Limitation," dated June 2001 (GAO-01-782/ OSD Case 4008). The Department appreciates the opportunity to comment on the draft report.

The draft GAO report reiterates issues highlighted in prior GAO reports on the F-22 production cost estimates. The Department has previously responded to these GAO concerns, and we are continuing efforts to address and mitigate these matters.

There continues to be a significant difference between the OSD and the Air Force production cost estimates for the F-22 program. As actual production cost data accrues, and as new contracts are negotiated, the verification of the estimates will emerge.

The amount of savings attributed to the Production Cost Reduction Plans (PCRP) has increased considerably since their inception in January 1997. Under a capped program, the PCRP remain a principal method for maintaining cost control on the F-22 program. As cost pressures have increased, so have the number of the PCRP and the savings attributable to them.

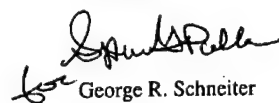
The quarterly cost and schedule reviews to the Defense Acquisition Executive (DAE) are one of the key oversight mechanisms in the Department's aggressive efforts to maintain cost control on the F-22. Since there are over 1100 individual PCRP, it would be neither prudent nor productive to use the DAE's time to report progress on each of these at the quarterly reviews.



We will continue to explore methods to track and report the key PCRPs data for the DAE's review. At the last quarterly review on June 5, 2001, all 343 airframe-related PCRPs were highlighted.

The Department provided more detailed editorial comments under separate cover.

Sincerely,

A handwritten signature in dark ink, appearing to read "George R. Schneider", is written over the printed name.

George R. Schneider
Director
Strategic and Tactical Systems

Appendix II: GAO Staff Acknowledgments

Marvin E. Bonner, Christopher T. Brannon, Edward R. Browning, Arthur L. Cobb, Michael J. Hazard, Don M. Springman, and John Van Schaik made key contributions to this report.

Related GAO Products

Tactical Aircraft: F-22 Development and Testing Delays Indicate Need for Limit on Low-Rate Production (GAO-01-310, Mar. 15, 2001).

Supporting Congressional Oversight: Framework for Considering Budgetary Implications of Selected GAO Work (GAO-01-447, Mar. 9, 2001).

Defense Acquisitions: Recent F-22 Production Cost Estimates Exceeded Congressional Limitation (GAO/NSIAD-00-178, Aug. 15, 2000).

Defense Acquisitions: Use of Cost Reduction Plans in Estimating F-22 Total Production Costs (GAO/T-NSIAD-00-200, June 15, 2000).

Budget Issues: Budgetary Implications of Selected GAO Work for Fiscal Year 2001 (GAO/OCG-00-8, Mar. 31, 2000).

F-22 Aircraft: Development Cost Goal Achievable If Major Problems Are Avoided (GAO/NSIAD-00-68, Mar. 14, 2000).

Defense Acquisitions: Progress in Meeting F-22 Cost and Schedule Goals (GAO/T-NSIAD-00-58, Dec. 7, 1999).

Fiscal Year 2000 Budget: DOD's Procurement and RDT&E Programs (GAO/NSIAD-99-233R, Sept. 23, 1999).

Budget Issues: Budgetary Implications of Selected GAO Work for Fiscal Year 2000 (GAO/OCG-99-26, Apr. 16, 1999).

Defense Acquisitions: Progress of the F-22 and F/A-18E/F Engineering and Manufacturing Development Programs (GAO/T-NSIAD-99-113, Mar. 17, 1999).

F-22 Aircraft: Issues in Achieving Engineering and Manufacturing Development Goals (GAO/NSIAD-99-55, Mar. 15, 1999).

F-22 Aircraft: Progress of the Engineering and Manufacturing Development Program (GAO/T-NSIAD-98-137, Mar. 25, 1998).

F-22 Aircraft: Progress in Achieving Engineering and Manufacturing Development Goals (GAO/NSIAD-98-67, Mar. 10, 1998).

Tactical Aircraft: Restructuring of the Air Force F-22 Fighter Program (GAO/NSIAD-97-156, June 4, 1997).

Defense Aircraft Investments: Major Program Commitments Based on Optimistic Budget Projections (GAO/T-NSIAD-97-103, Mar. 5, 1997).

F-22 Restructuring (GAO/NSIAD-97-100R, Feb. 28, 1997).

Tactical Aircraft: Concurrency in Development and Production of F-22 Aircraft Should Be Reduced (GAO/NSIAD-95-59, Apr. 19, 1995).

Tactical Aircraft: F-15 Replacement Issues (GAO/T-NSIAD-94-176, May 5, 1994).

Tactical Aircraft: F-15 Replacement Is Premature as Currently Planned (GAO/NSIAD-94-118, Mar. 25, 1994).

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